



The Making of the Seasonal Drought Outlook

Chester Schmitt

NOAA/CPC

North American Drought Monitor Workshop

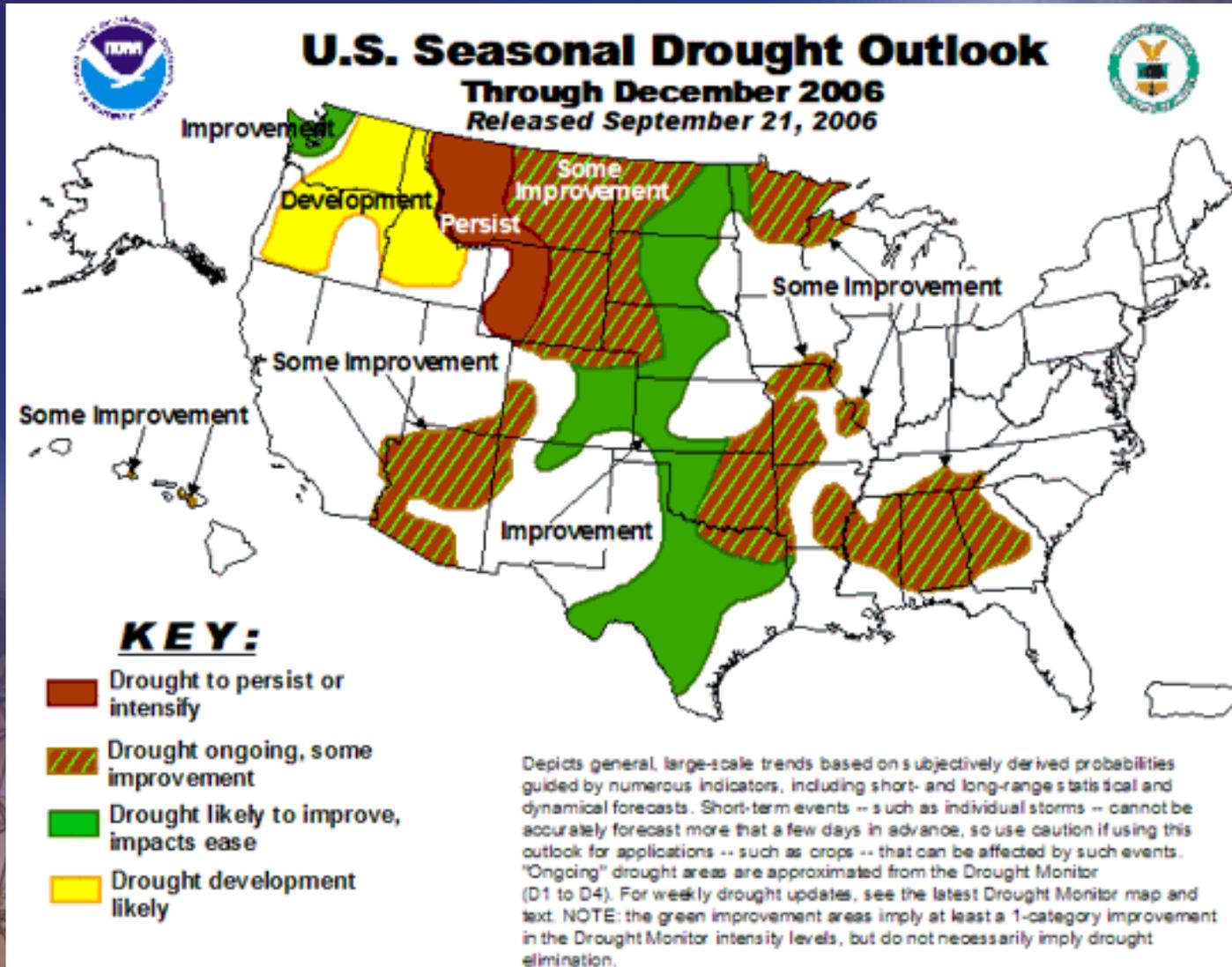
Mexico City, Mexico

October 18 – 19, 2006



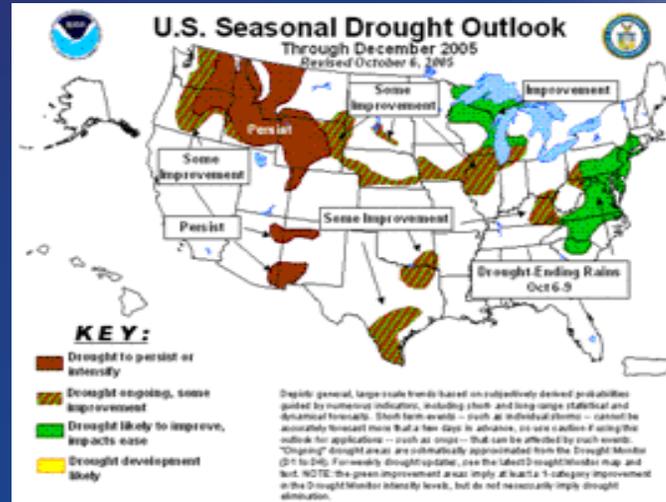


Latest Seasonal Drought Outlook





Short and Long-term Forecast Contributions



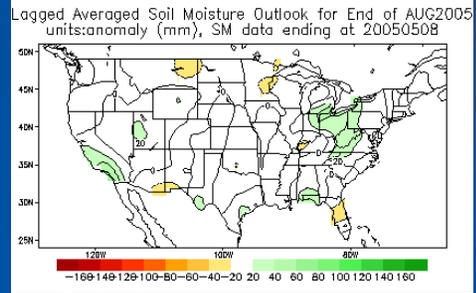
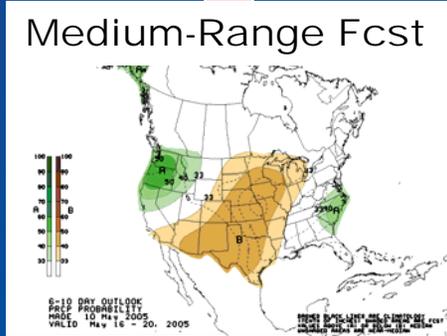
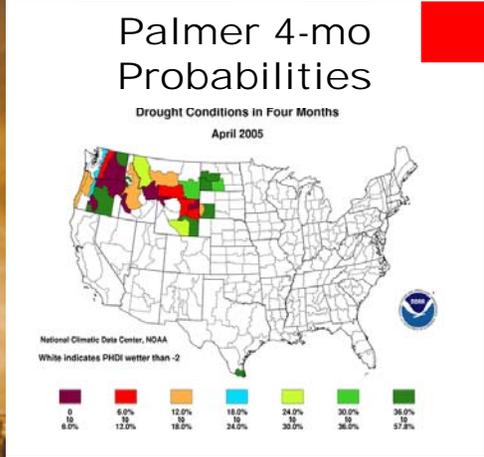
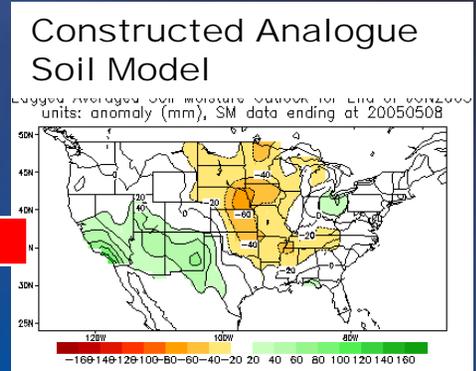
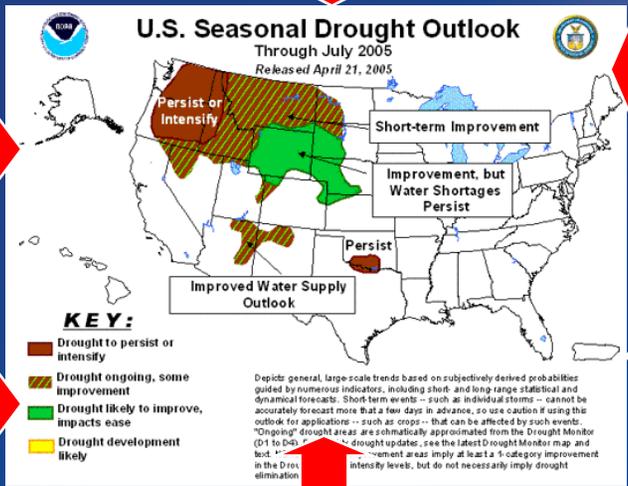
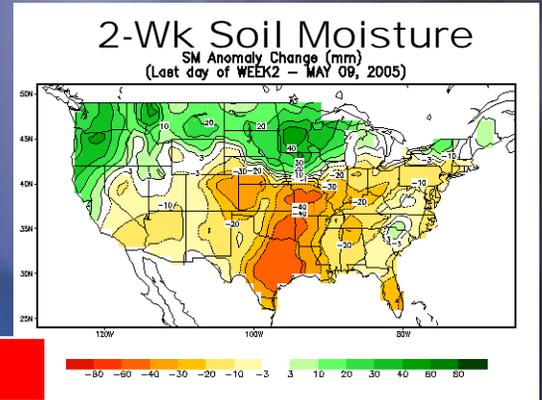
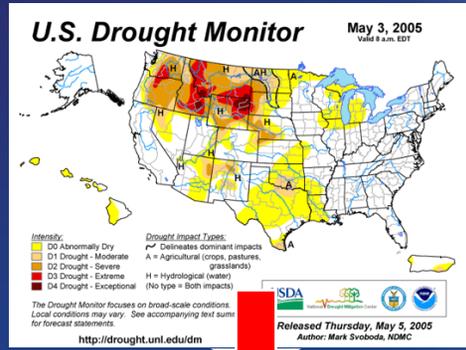
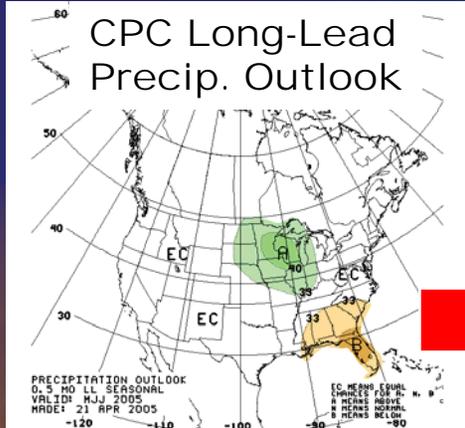
Start with
latest U.S. Drought
Monitor D1 areas

Short and medium
range considerations
(days-weeks)

Seasonal Outlooks



Principal Drought Outlook Inputs





Drought Outlook History



- **Originated in August 1999—went public in March 2000**
- **Intent is to present a simple national picture of where droughts will improve, persist, or develop**
- **Issued continuously each month, with updates as required, by any of 3 CPC forecasters**



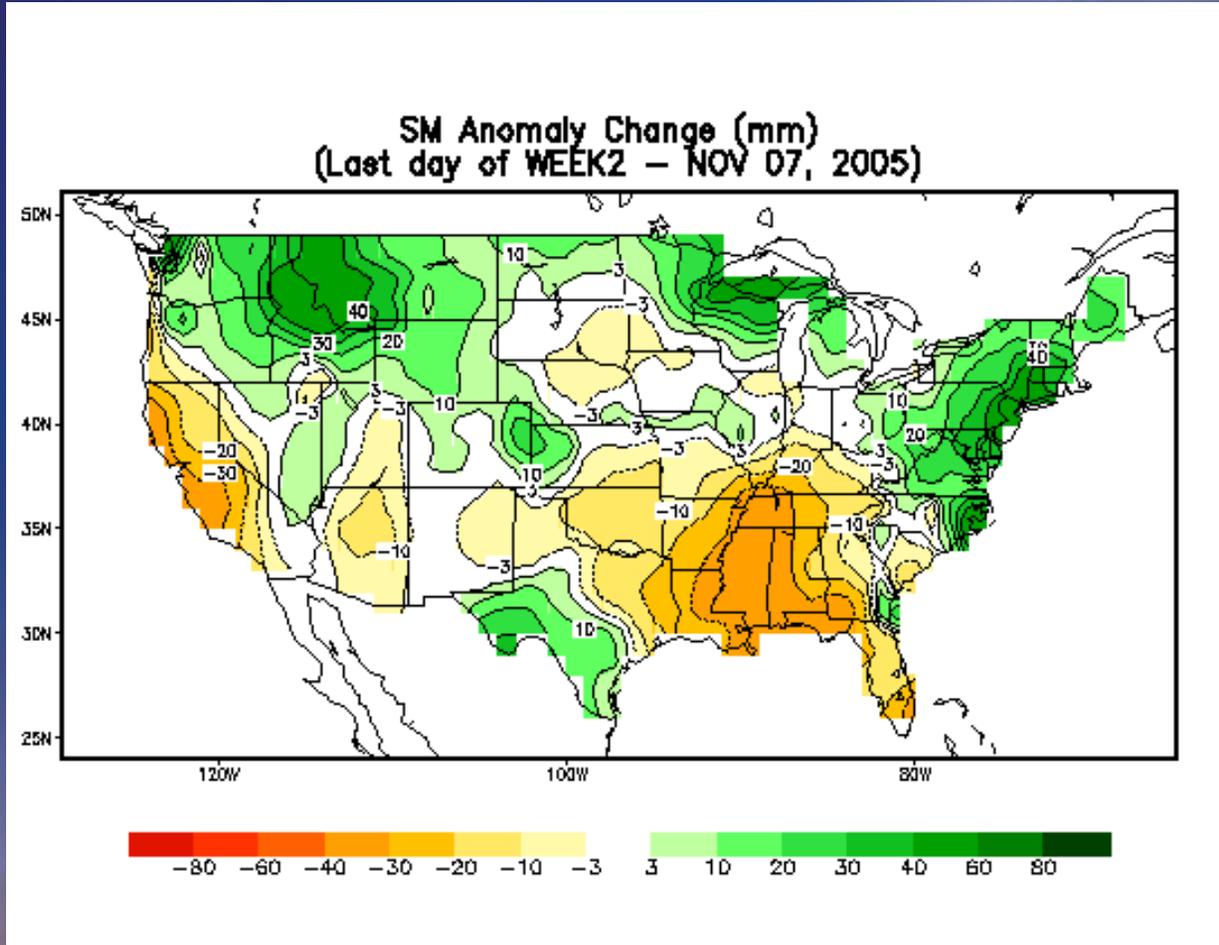
Selected Forecast Tools





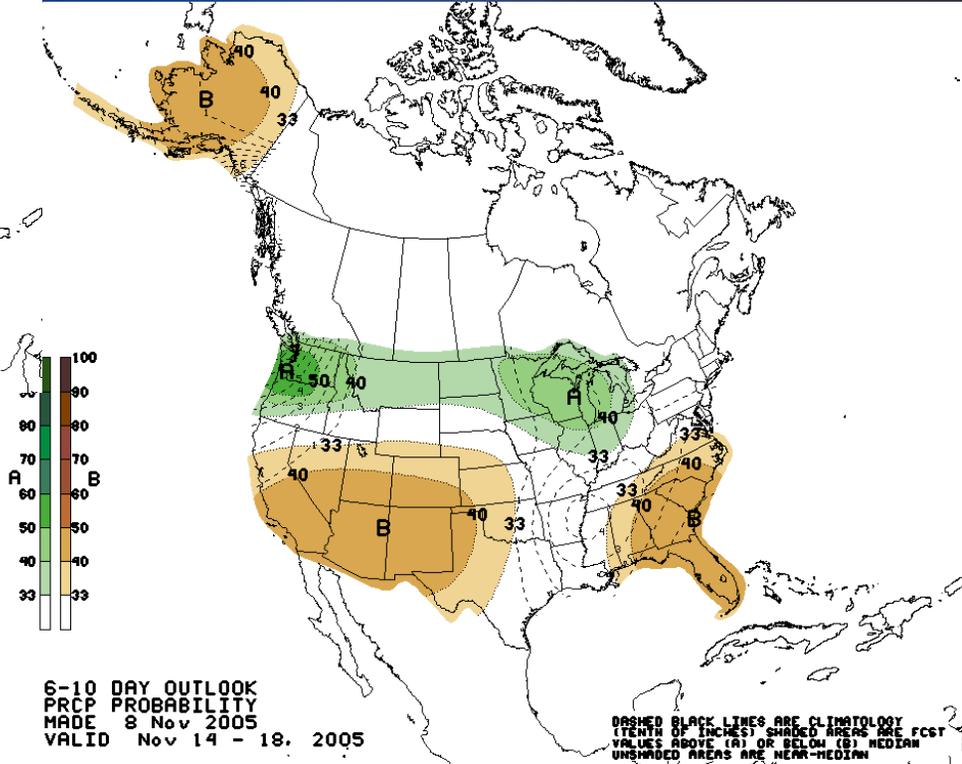
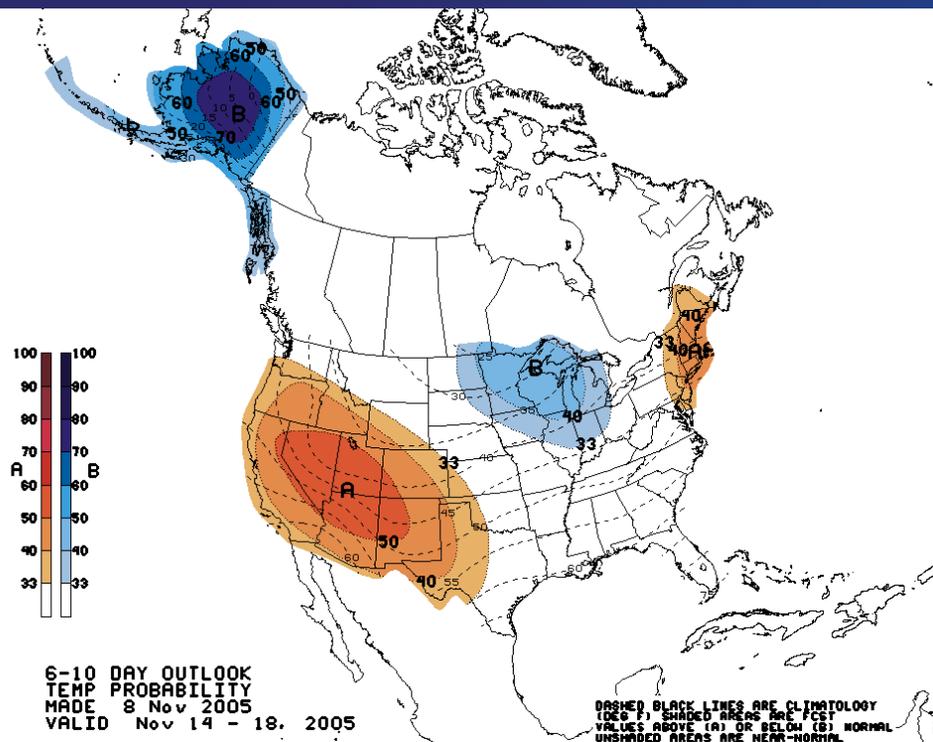
CPC 2-Wk Soil Moisture Forecast

<http://www.cpc.ncep.noaa.gov/soilmst/cas.shtml>





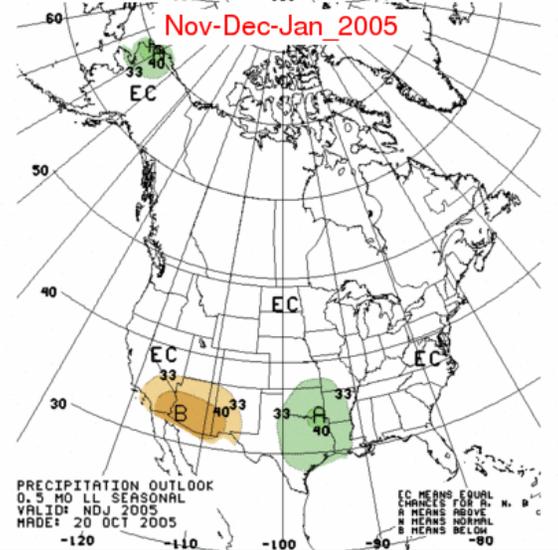
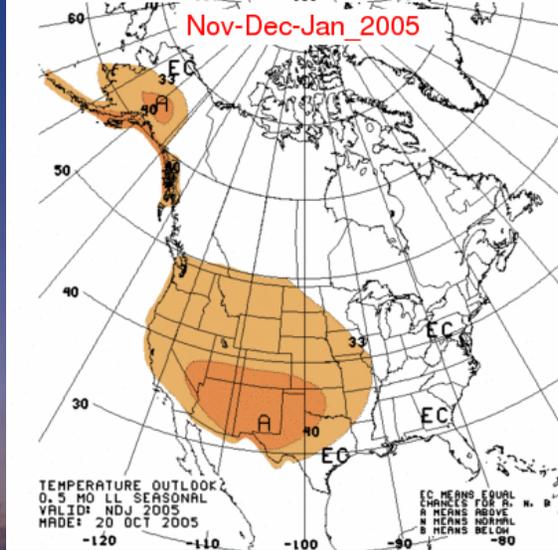
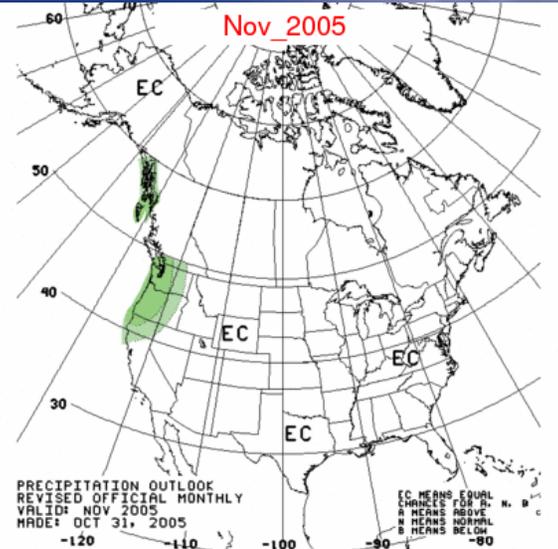
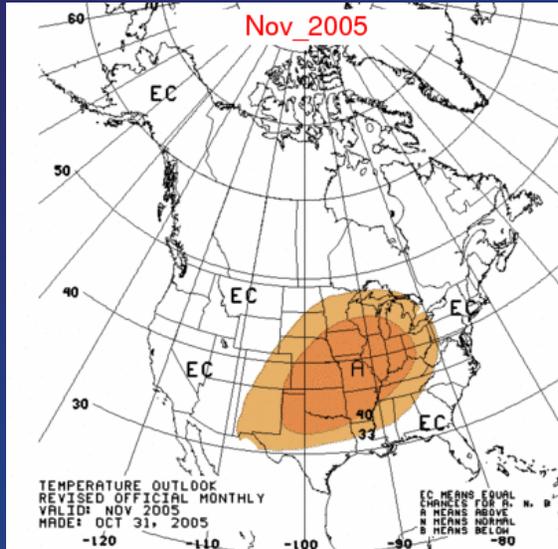
Official CPC 6-10-day Forecast





<http://www.cpc.ncep.noaa.gov/products/predictions/90day/>

Official CPC Seasonal Outlooks

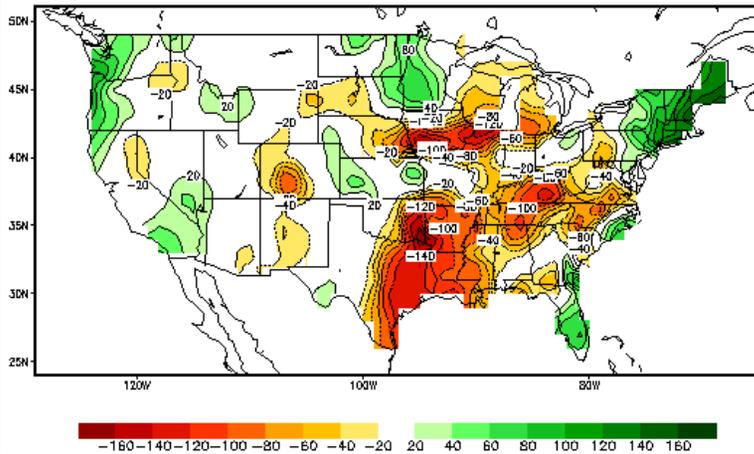




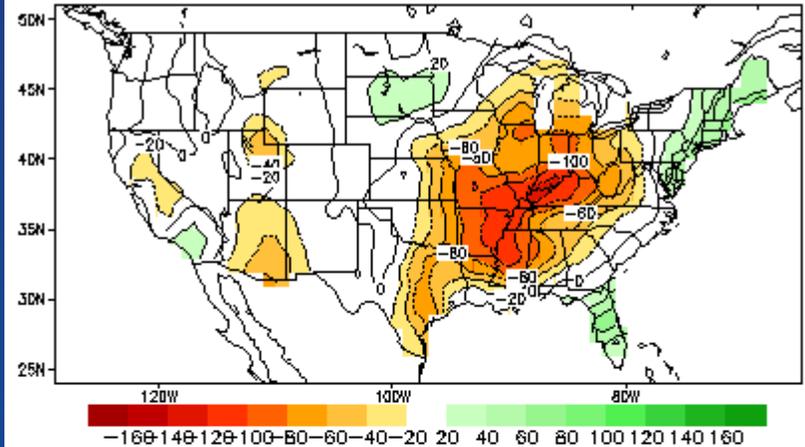
Constructed Analog Soil (CAS) Moisture Forecast

Observed

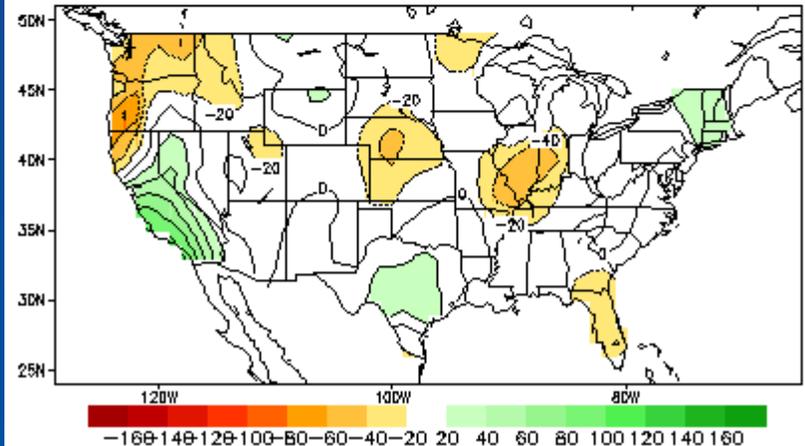
Calculated Soil Moisture Anomaly (mm)
NOV 07, 2005



Lagged Averaged Soil Moisture Outlook for End of DEC2005
units: anomaly (mm), SM data ending at 20051107



Lagged Averaged Soil Moisture Outlook for End of FEB2006
units: anomaly (mm), SM data ending at 20051107





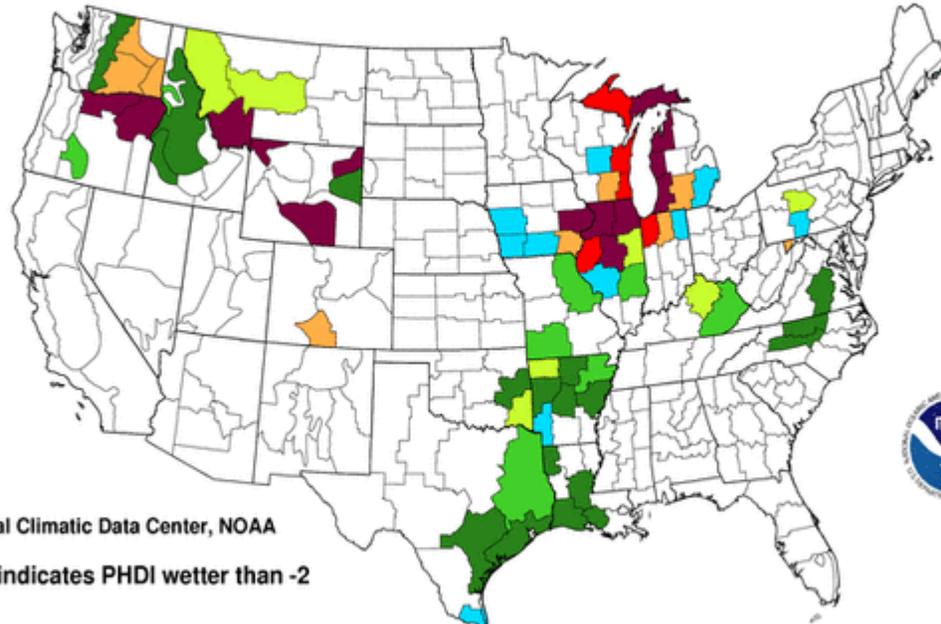
<http://www.ncdc.noaa.gov/oa/climate/research/drought/current.html>

NCDC Drought Amelioration Probabilities



Probability of Precipitation Required to Ameliorate Current Drought Conditions in Four Months

October 2005



National Climatic Data Center, NOAA

White indicates PHDI wetter than -2





How Are We Doing?



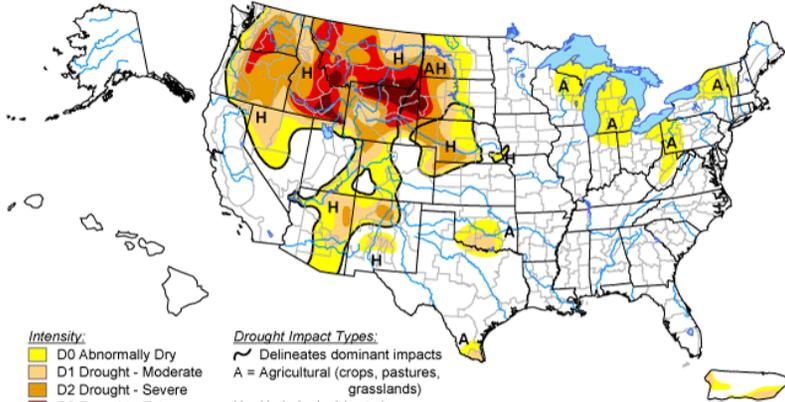


Sample Drought Verification Panel



U.S. Drought Monitor

April 19, 2005
Valid 8 a.m. EDT



Intensity:
 D0 Abnormally Dry
 D1 Drought - Moderate
 D2 Drought - Severe
 D3 Drought - Extreme
 D4 Drought - Exceptional

Drought Impact Types:
 ~ Delineates dominant impacts
 A = Agricultural (crops, pastures, grasslands)
 H = Hydrological (water)
 (No type = Both impacts)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

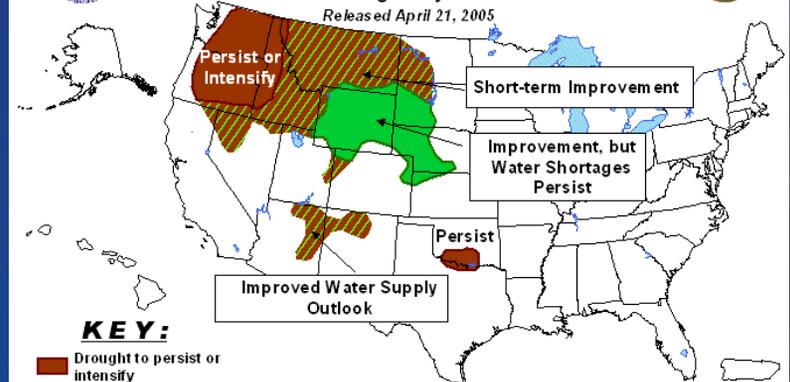
<http://drought.unl.edu/dm>



Released Thursday, April 21, 2005
Author: Richard Tinker, NOAA/NWS/NCEP/CPC

U.S. Seasonal Drought Outlook

Through July 2005
Released April 21, 2005



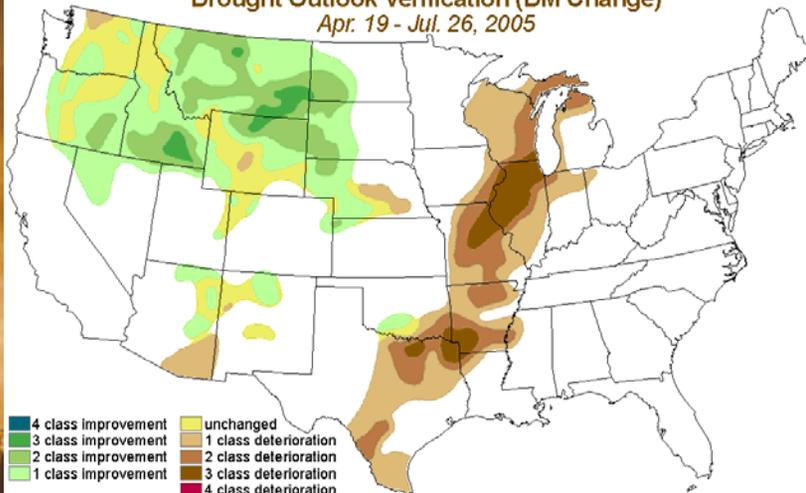
KEY:

- Drought to persist or intensify
- Drought ongoing, some improvement
- Drought likely to improve, impacts ease
- Drought development likely

Depicts general, large-scale trends based on subjectively derived probabilities guided by numerous indicators, including short- and long-range statistical and dynamical forecasts. Short-term events -- such as individual storms -- cannot be accurately forecast more than a few days in advance, so use caution if using the outlook for applications -- such as crops -- that can be affected by such events. "Ongoing" drought areas are schematically approximated from the Drought Monitor (D1 to D4). For weekly drought updates, see the latest Drought Monitor map and text. NOTE: the green improvement areas imply at least a 1-category improvement in the Drought Monitor intensity levels, but do not necessarily imply drought elimination.

Drought Outlook Verification (DM Change)

Apr. 19 - Jul. 26, 2005

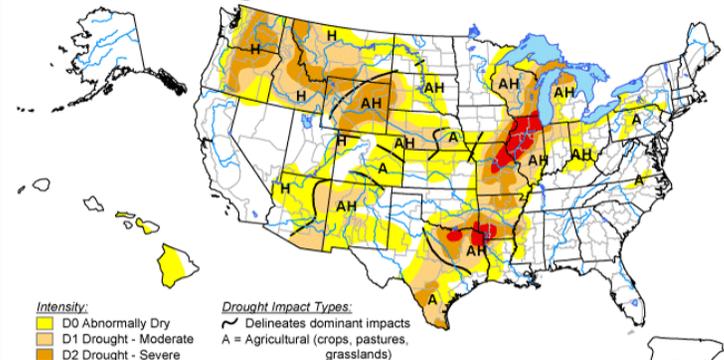


4 class improvement
3 class improvement
2 class improvement
1 class improvement

unchanged
1 class deterioration
2 class deterioration
3 class deterioration
4 class deterioration

U.S. Drought Monitor

July 26, 2005
Valid 8 a.m. EDT



Intensity:
 D0 Abnormally Dry
 D1 Drought - Moderate
 D2 Drought - Severe
 D3 Drought - Extreme
 D4 Drought - Exceptional

Drought Impact Types:
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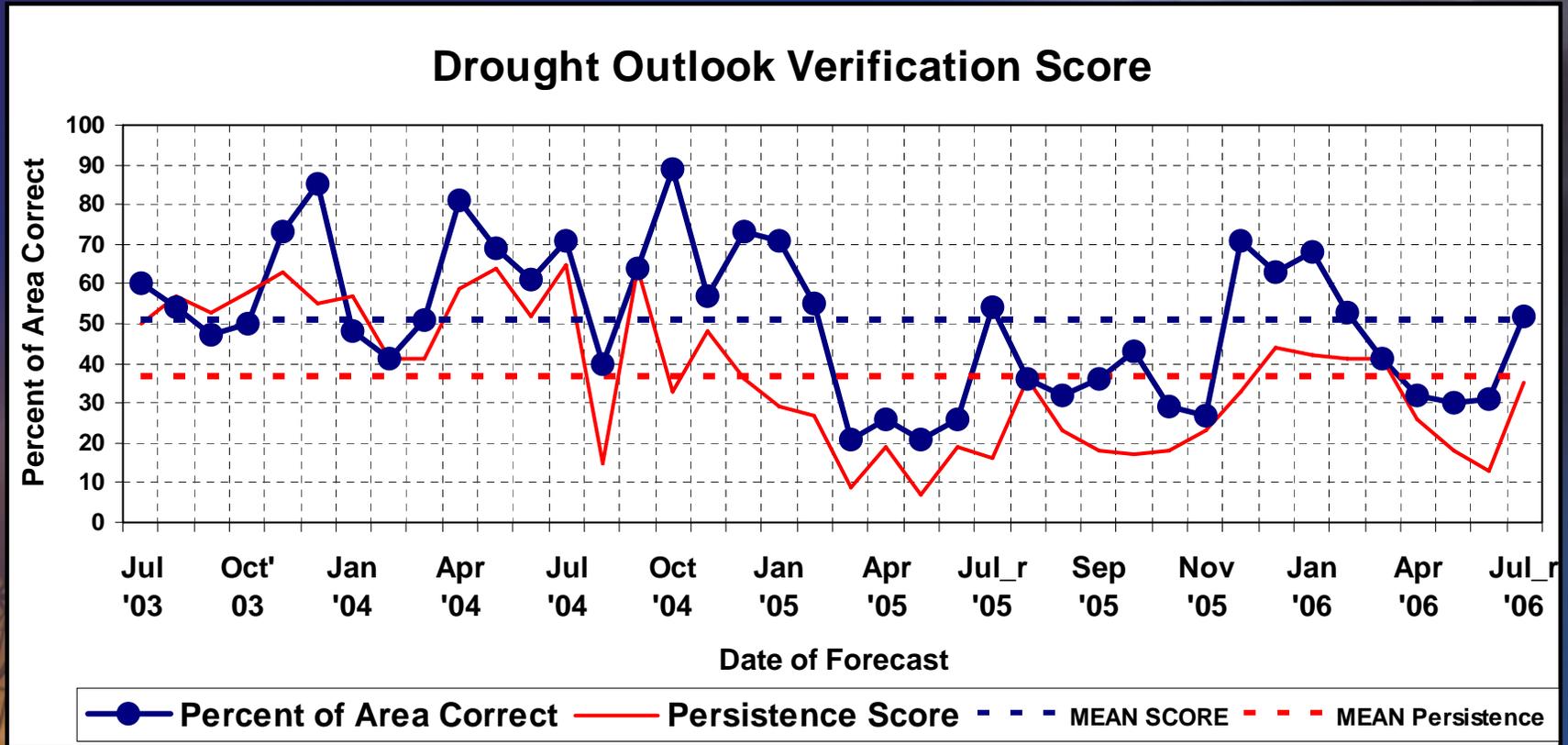
<http://drought.unl.edu/dm>



Released Thursday, July 28, 2005
Author: C. Tankersley/J. Enloe, NOAA/NESDIS/NCDC



Time Series of Verification Scores



Mean Pct Correct 51%

Mean Persistence Score 39%



Selected Future Improvements



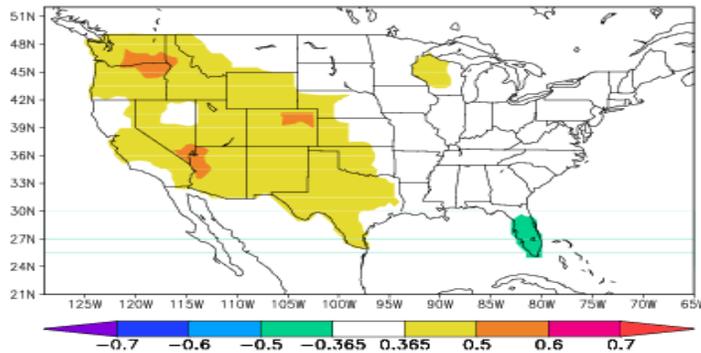
- **Better seasonal temp/precip forecasts thanks to new consolidation tool**
- **Better seasonal soil moisture forecasts from NLDAS projects (Univ. of WA, Princeton, NCEP)**
- **Research leading to improved understanding of the underlying causes of drought (e.g., air-sea and ground-air interactions)**



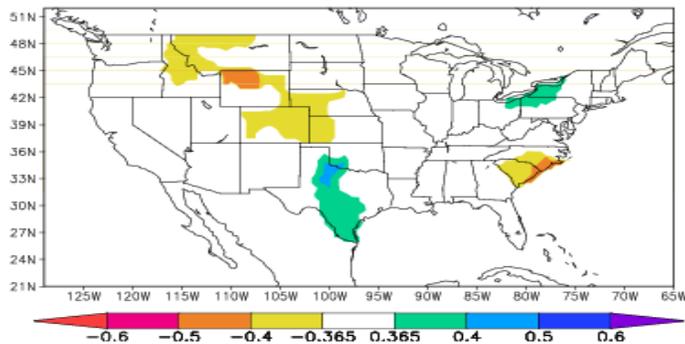
New Consolidated Seasonal Forecast



CON T CFS Lead 1 NDJ 05 Made OCT 2005



CON P CFS Lead 1 NDJ 05 Made OCT 2005



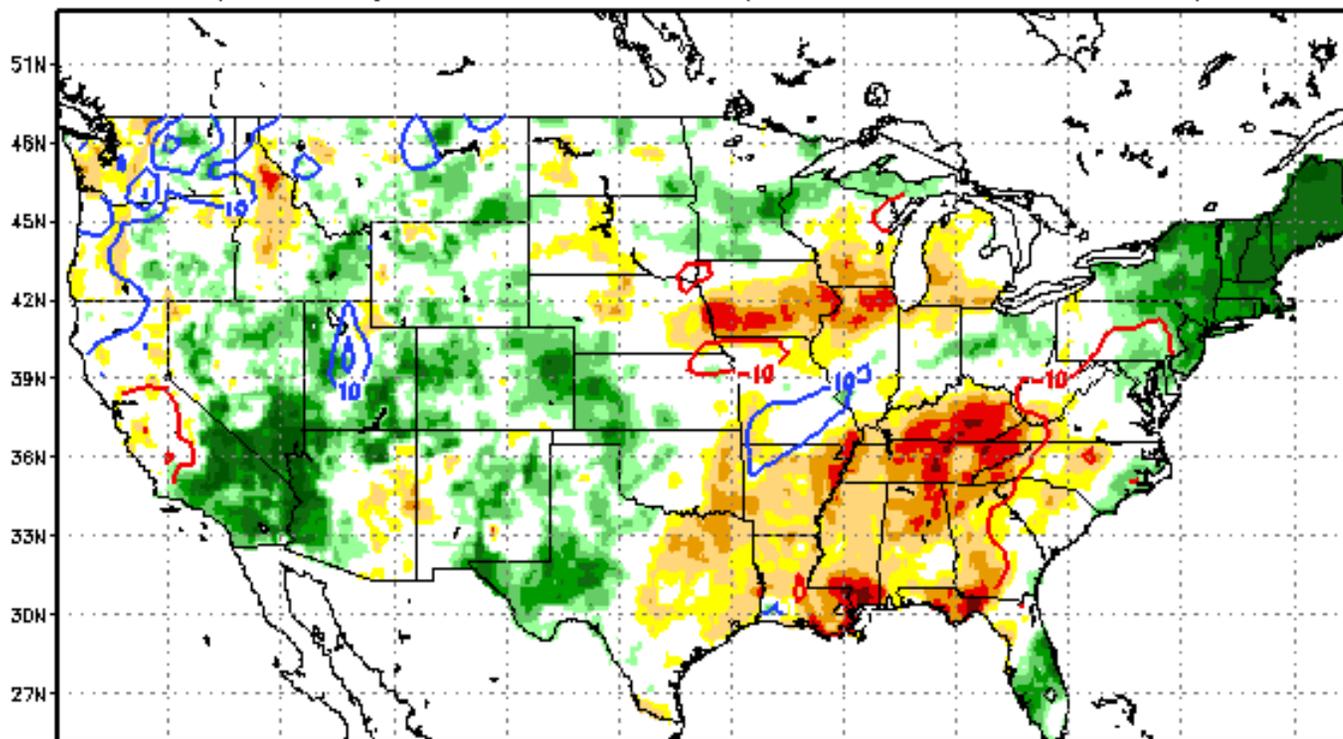
**A weighted
combination
of 4 models**



North American Land Data Assimilation System (NLDAS)



Total Column Soil Moisture Percentiles on 20051103
(wrt samples within a 11-day window in 1951-2004)



Contours show the changes in quantiles in the last 7 days.



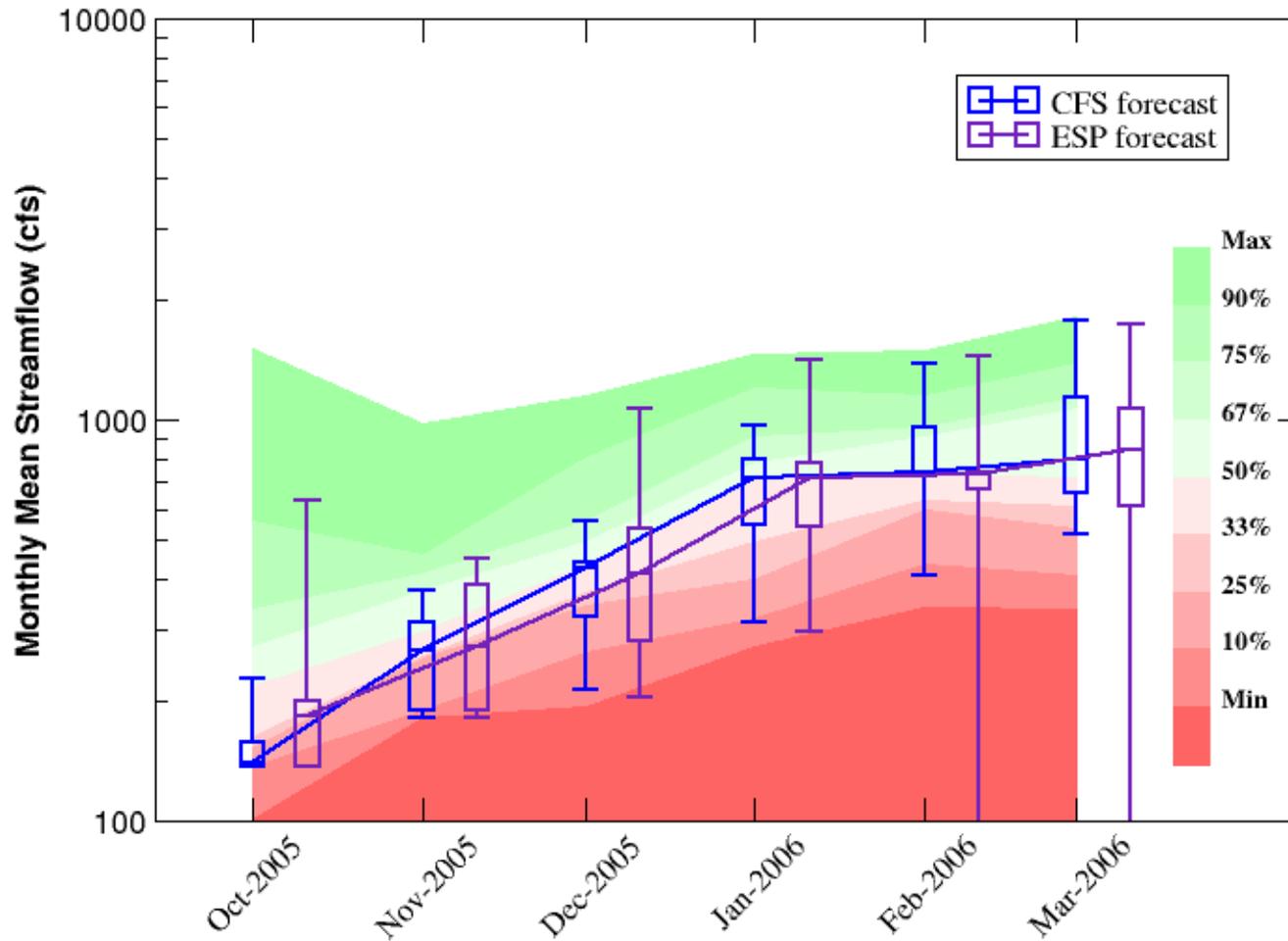


Sample NLDAS Streamflow Forecast



Seasonal Streamflow Forecast (Init: 200510)

USGS 02197830 (33.1182°N, 81.9637°W), Drainage Area: 473.00 sq.miles

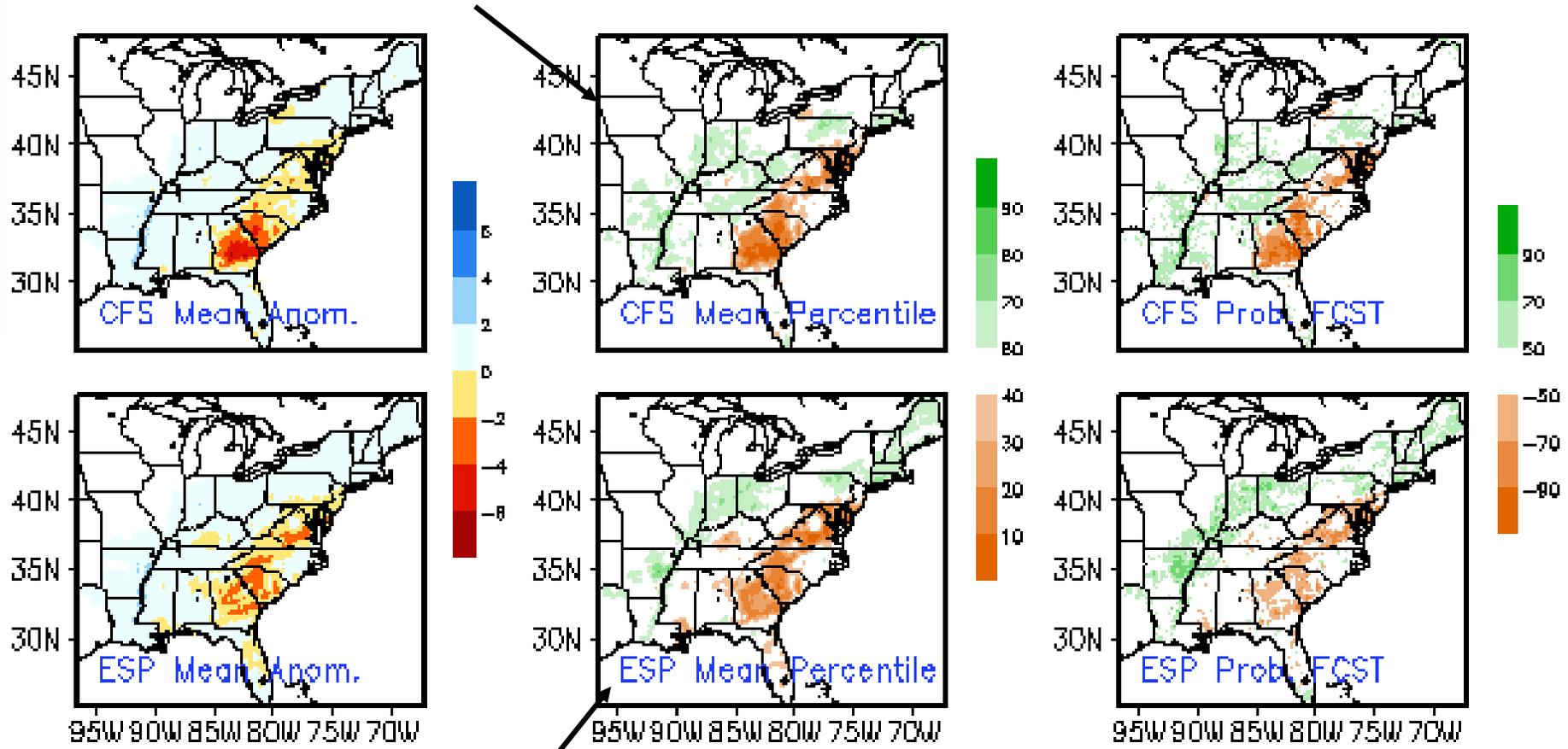




Soil Moisture L1 Forecast



Coupled Forecast System



Ensemble Streamflow Prediction



Goals



- **Make seasonal drought outlooks more objective**
- **Make outlooks more quantitative (including probabilities)**
- **Make outlooks more accurate**
- **Make outlooks more useful**